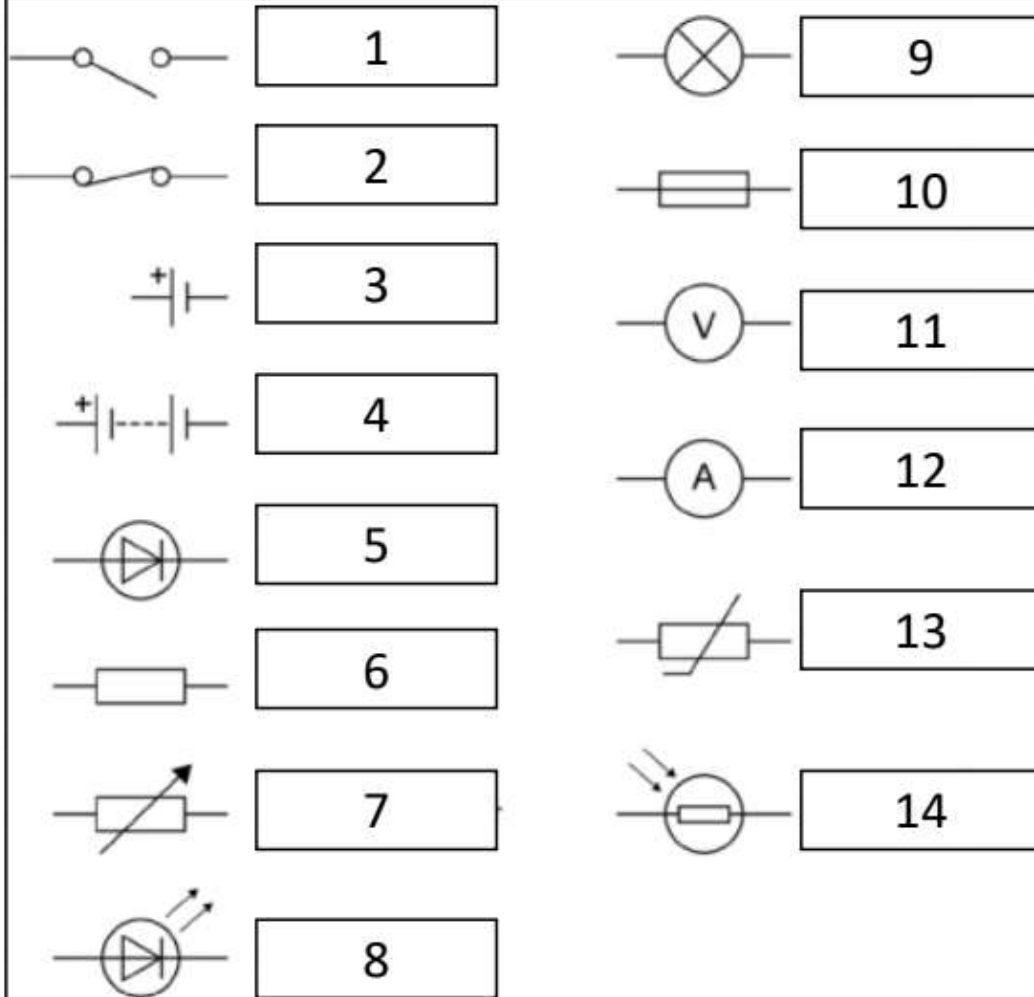


1. Standard circuit diagram symbols



1	Switch (open)	8	LED (light emitting diode)
2	Switch (closed)	9	Lamp (bulb)
3	Cell	10	Fuse
4	Battery	11	Voltmeter
5	Diode	12	Ammeter
6	Resistor	13	Thermistor
7	Variable resistor	14	LDR (light-dependent resistor)

2. Electrical charge and current

Charge flow = current x time

$$Q = I \times t$$

Q = Charge (in Coulombs C)

I = Current (in Amps A)

t = Time (in seconds s)

3. Potential difference and energy

Energy = charge flow x potential difference

$$E = Q \times V$$

E = Energy transferred (in Joules J)

Q = Charge (in Coulombs C)

V = Potential difference (in Volts V)

4. Resistance (Ohm's law)

Potential difference = current x resistance

$$V = I \times R$$

V = Potential difference (in Volts V)

I = Current (in Amps A)

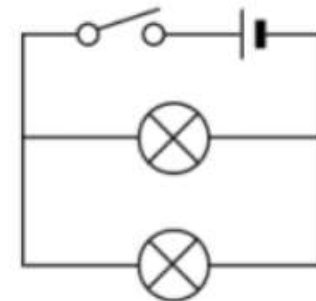
R = Resistance (in Ohms Ω)

AQA Physics GCSE Knowledge organiser Yr10 Electricity Part 1 Electric circuits

5. Series and parallel circuits rules

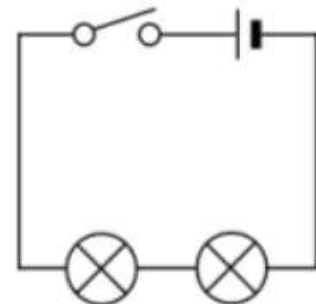
Parallel circuits

- The current splits at junctions.
- The volts of the battery are not shared. Each parallel branch gets the full Volts of the battery.
- Adding more resistors in parallel decreases the total resistance.



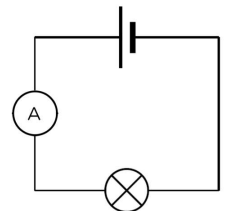
Series circuits

- The current does not split. It is the same at all points.
- The volts of the battery are shared.
- Adding more resistors in series increases the total resistance.

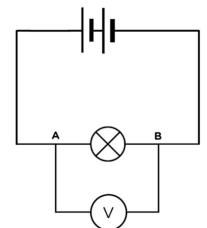


6. Using ammeters and voltmeters

Add ammeters in series.

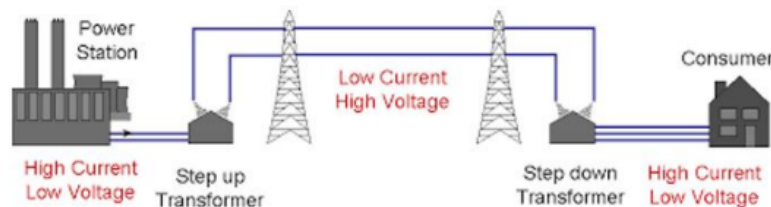


Add voltmeters in parallel.

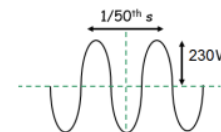


Electric current	Flow of electric charge . Units amperes, A
Alternating Current AC	The current alternates (changes direction) e.g. mains electricity
Direct Current DC	The current flows in one direction only e.g. cells or batteries.
Mains Electricity	Electricity provided by the national grid (is an alternating current of 230V and a frequency of 50Hz.)
National Grid	A series of cables and transformers linking power stations to consumers.
Step-up Transformer	Increases the potential difference for transmission across power cables. This makes the National Grid efficient.
Step-down Transformer	Reduces the potential difference from the cables to 230V for use by consumers.

The National Grid supplies electricity from power stations via a series of cables and transformers to customers at **high voltages** to **reduce energy loss**.



Alternating Current **AC**

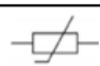


The **current alternates** (changes direction.)

Direct current **DC**



Direct current flows **in one direction**



Thermistor

Temperature dependent resistor. Has high resistance when temperature is low.

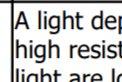


Diode

Allows current in one direction only.

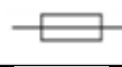


LDR



LED

Light emitting diode emits light when a current passes through it in the correct direction.



Fuse

Breaks the circuit if current exceeds a certain amount.

Three pin electrical plug	
Live wire	Carries the current (brown wire). Connects to fuse. About 230V.
Neutral wire	Completes the circuit (blue wire). Around 0V
Earth	Prevents electric shock (green & yellow wire). Is connected to the longest pin in a plug and carries current safely to earth if there is a fault.
Fuse	Contains a thin wire that melts and cuts off the current if too much current passes through it.
Sockets and plug cases	made of plastic because it's a good electrical insulator .
Mains cable	made up of two or three insulated copper wires surrounded by an outer layer of plastic.

<u>Graph</u>	<u>Example</u>	<u>Explanation</u>
	Ohmic conductor (Fixed resistor or wire)	Fixed Resistor or wires are Ohmic Conductors. Current and potential difference are directly proportional . Resistance is constant.
	Filament Lamp (bulb) non Ohmic conductors	Resistance of a filament lamp is not constant . As temperature increases, resistance increases. Ions within the lamp vibrate more , increasing collisions with electrons .
	Diode or LED	Diode/LED The current through a diode/LED flows in one direction only . The diode has a very high resistance in the reverse direction .

Yr9 Electricity Part 2